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ABSTRACT

Several things influencing a college student's choice of major were investigated: gender, sex-role attitudes, cognitive styles, and decision-making processes. Students (N=578) were administered six different measures of sex-role attitudes and five different measures of cognitive style. Use of a path analysis technique suggested that gender influences sex-role attitudes, sex-role attitudes and decision-making style influence progress through the decision-making process, and that progress through the decision-making process influences decisional status. Cross-validation was performed among students at four different universities; student maturity did not appear to change the results. Commitment to a career appears to be central to one's identity and one's sex-role ideology. Counseling psychologists should recognize that self-assessment influences decisions, and decision making influences self-assessment. (Author/KMF)

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Cognitive and Attitudinal Influences on Career Decision Making*

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Abstract

Harren et al. (1978) investigated the relative influence of gender, sex-role attitudes, cognitive styles, and decision-making process on college students' choice of major. By means of a causal path analysis, hypotheses regarding specific direct and indirect influences among these variables were investigated. This paper presents additional data which investigates: (1) the cross-validation of this path analysis to four other college campuses; (2) the replication of specific paths when the occurrence of maturation is taken into account; and (3) the possibility of spurious relationships in the original path model. This last question was investigated by means of crossed-lag panel analysis.

Cognitive and Attitudinal Influences on Career Decision Making*

The purpose of this research was to test the construct validity of Tiedeman's theory of career decision making (CDM) and of an instrument, the Assessment of Career Decision Making (ACDM) (Harren, 1976), designed to measure CDM in college students.

Tiedeman and his associates (Tiedeman & O'Hara, 1963; Miller & Tiedeman, 1972) have developed a model of CDM which postulates progress through seven psychological stages. The first four stages are anticipatory or planning stages and are described as follows:

Exploration: Marked by unrestricted exploration with vague concerns about a decision but having no developed strategy. A sample ACDM item is, "I don't know how to go about choosing a major."

Crystallization: Progress begins. Alternatives are evaluated and narrowed down in light of previous experience and future expectations. A sample item is, "There are a number of majors which I have decided against."

Choice: A definite commitment is made to a particular goal, accompanied by relief and naive optimism about the future. A sample item is, "I've decided what I will major in."

Clarification: The consequences of the choice are elaborated. Planning the follow-through begins. A sample ACDM item is, "Some advanced courses in my major look pretty hard."

Harren, Kass, Tinsley, and Moreland (1978) investigated the influence of gender, sex-role attitudes, cognitive styles, and the CDM process as measured by the Assessment of Career Decision Making (ACDM) on the reported decisional status of students regarding choice of a college major. Five hundred and seventy eight students from all four academic classes were tested. The relationships among the variables were analyzed by means of path analysis which permits

the decomposition of correlations between variables into direct and indirect effects. The results of that study are depicted in figure 1.

A strength of Harren et al.'s study lies in its use of six different measures of sex-role attitudes and five different measures of cognitive style. Using every possible combination of the six sex-role attitude scales with the five cognitive style measures resulted in thirty path analysis models. While this enhances the generalizability of the constructs, it also necessitates the cross-validation of the statistical results. Harren et al. found that gender had an effect on sex-role attitudes and that CDM process had a direct effect on decisional status in all 30 models. These strong effects are represented by double arrows in figure 1. When certain measures of sex-role attitudes and/or cognitive style were used, these constructs were seen as having a direct effect on the CDM process. These paths were significant in 20 and 18 of the 30 possible models respectively, and are indicated by the single solid arrows in figure 1. The single dotted arrows from sex-role attitudes to cognitive style and from both of these variables to decisional status indicate a weak direct causal effect. These paths were found to be significant in only 13, 7, and 6 of the 30 possible models, respectively.

These results can be summarized as follows: Gender influences sex-role attitudes; sex-role attitudes and decision-making style influence progress through the decision-making process; and, progress through the decision-making process influences decisional status (Harren et al., 1978). Thus, Tiedeman's CDM process, as measured by the ACDM, is an important intervening variable. Gender, sex-role attitudes and cognitive style, for the most part, affect the decision concerning a major only insofar as they influence the student's progress through the four psychological stages of the CDM process.

The present paper represents a continuation and extension of Harren et al.'s

study. Of interest were the following questions:

1. Can these results be generalized to students on other university campuses?

2. Does the pattern of cause and effect depicted in figure 1 remain constant as the individual college student matures?

3. Are the relationships between the variables depicted in figure 1 actual cause and effect relationships?

Method

Subjects

In the Harren et al. original study, data were obtained from 578 students at Southern Illinois University (SIU) during the Fall of 1976. At this same time, cross-validation samples were tested at Virginia Commonwealth University (N = 92), Texas Technological University (N = 102), and Ohio State University (N = 90). In the late Spring of 1977, the seniors from the Harren et al. original SIU sample were retested before they graduated, and the original freshmen, sophomores, and juniors from the same SIU study were retested in the Fall of 1977, a year after their initial testing session (N = 340). Also during the Fall of 1977, data from another cross-validation sample were collected at the University of Houston (N = 107), and a new sample of SIU freshmen (N = 98) were tested and retested again in the following spring.

Instrumentation

The ACDM has been developed by Harren (1976) to measure progress through Tiedeman's decision-making process. Forty items of the ACDM concern the college student's progress in deciding on a college major and reflect progress through Tiedeman's first four stages. The ACDM has been used in a number of studies to evaluate the effectiveness of career counseling or instructional programs (Berman, Gelso, Greenfeig, & Hirsch, 1977; Cochran, Hoffman, Strand, & Warren,

1977; Smith & Evans, 1973; Streufert, 1975; Wachowiak, 1972). These studies provide considerable construct validity for the ACDM and support its use in the present research.

Sex-role attitudes were measured using three instruments yielding five scale scores. The Bem Sex Role Inventory (BSRI; Bem, 1974) measures three self-attributed sex-role characteristics: femininity (BSRI-F), masculinity (BSRI-M), and androgeny. Bem's androgeny scale was not scored in the present research because it was found not to be appropriate for correlational studies. As an alternative to Bem's t-score androgeny scale, Harren et al. developed an androgeny scale (BSRI-X) based on the subjects' high and low scores on the masculine and feminine scales. Two instruments were used to measure subjects' attitudes towards the sex-role appropriate behavior of men and women: the Attitudes Twoards Women Scale (AWS; Spence & Helmreich, 1972; Spence, Helmreich, & Stapp, 1973) and the Attitudes Towards Masculine-Transcendence Scale (AMTS; Moreland & Van Tuinan, 1976). The four measures of cognitive styles in the present investigation included three decision-making style scales from the ACDM. These three scales measure a rational (DMS-R), intuitive (DMS-I), and dependent (DMS-D) career decision-making style. The fourth measure of cognitive style was the Cognitive Differentiation Grid (CDG: Bodden, 1970), which measures the extent to which an individual uses a range of cognitive constructs in rating various occupations. An instrument used in the previous research was the Paragraph Completion Method (PCM), a semi-projective device designed by Hunt (1971) to measure conceptual level. The PCM was not scored in the present sample because it had not related to any of the other measures in the earlier study.

The criterion for the decisional status variable was the same as used by Harren et al. Students were partitioned into two groups. Group I included

those individuals who indicated they had not made a choice of major. It also included those individuals who had made a choice of major but who indicated they were not highly satisfied with the choice. Satisfaction was measured by a 9-point scale (1 = Dissatisfied; 9 = Satisfied). Students with ratings of 7 or above were classified as "highly satisfied." Group II consisted of those individuals who had made a choice of major and who also indicated that they were highly satisfied with their choice. By taking into account the degree of satisfaction with a stated criterion of choice-no choice, Holland and Holland (1977) found more definable results.

Analysis

Question 1, the degree of generalizability to other college students, was analyzed by repeating the path analysis on the combined group of the four alternative campuses.

To investigate question 2 concerning the effects of maturation, a comparison was made between the pattern of results obtained in the original path analysis and a path analysis performed on the one-year follow-up sample.

Question 3, the degree to which the path analysis relationships can be regarded as cause-effect relationships, was analyzed using a cross-lagged panel analysis. A path analysis is limited in that it will sort out the causal relationships among only those variables which are selected for the study. Path analysis requires the assumption that no variables other than those already entered into the equation (gender, sex-role attitudes, cognitive styles, CDM process, and decisional status) influenced the relationship among the measured variables. If this assumption is violated, the "direct causal influence" of CDM on decisional status found by the path analysis in the Harren et al. study would in actuality be a "spurious" relationship.

The appropriate test for spurious relationships is a cross-lagged panel

analysis (Kenny, 1975). A cross-lagged panel analysis involves the examination of the interaction of two variables at two different points in time. Figure 2 depicts a cross-lagged analysis constructed to test the null hypothesis that a spurious relationship exists between the CDM process and decisional status. An examination of the difference between the two cross-lag correlations provides evidence for accepting or rejecting the null hypothesis of a spurious relationship. In rejecting the null hypothesis, the possibility of all other unmeasured variables influencing this particular relationship is statistically eliminated. The alternative hypotheses are that the CDM process causes decisional status or that the decisional status causes the CDM process. The direction of causality depends upon the signs of the cross-lagged difference and the synchronous correlations. Cross-lagged panel analysis is the best test to determine the presence of a real cause and effect relationship between two variables when experimental manipulations of the variables are not feasible.

Results

Cross-Validation of the Path Analysis on the Combined Non-SIU Sample:

The four non-SIU campuses resulted in a cross-validation sample of 390 students (Fresh=102, Soph=90, Jun=92, Sen=106; Females=166).

A path analysis procedure (Kerlinger & Pedhazur, 1973) provides a method for inferring direct and indirect causal relationships among a set of variables. In path analysis the correlation between any two variables is decomposed into path coefficients. The path coefficients indicate the direct effect that one variable has on another variable. If the path coefficients are small, the specific path is deleted from the model resulting in a more parsimonious model to explain the possible avenues of influence among the variables in the model. In this investigation, a path coefficient was judged to be lacking in psychological significance if the coefficient was not statistically significant

at the .01 level of confidence. This criterion is roughly equivalent to requiring the path coefficient to explain about 2% of the variance of a variable, given the degrees of freedom for both validation samples. For a more complete discussion of path analysis and its interpretation, see Harren et al. (1978).

Figure 1 indicates the original model to be tested in cross-validation. Since the present investigation used five scales to measure the sex-role attitudes construct and four scales to measure the cognitive styles construct, it was possible to construct 20 different path models using every possible combination of the appropriate scales. It was found that the results could be simplified. Five path models were discarded because one measure of the cognitive styles construct, CDG, was found not to directly influence any other variable. The remaining fifteen path models could be grouped into sets of path models having similar characteristics. These groupings are depicted in Table 1.

Insert Table 1 and Figure 3 about here

In Table 1, the 15 path models are grouped into seven model sets. The last four model sets have only one path model per set. Model set I is the most general pattern since it is comprised of six different path models. Although these six path models are formed from three different measures of sex-role attitudes and two different measures of cognitive styles, they have similar paths. Figure 3A represents the path diagram for the first path model in model set I. In Figure 3A, it can be seen that the gender of a college student has a direct effect on the sex-role attitude of the person as measured by the BSRI-F. However, gender does not have a direct effect on the decisional status of the student since there is no path (arrow) from gender to decisional status. Only the decision-making process as measured

by Harren's DMT-M scale has a direct effect on decisional status. The path coefficient for this effect is .52 indicating that for one unit of increase in DMT-M, there is a corresponding 52% of a standard deviation increase in decisional status. The path coefficient of .69 from E to decisional status indicates there remains 48% (i.e., $.69^2$) of the variance in decisional status unexplained and attributed to variables not in the model. Cognitive style as measured by DMS-I does not have a direct effect on decisional status since there is no direct path from cognitive style to decisional status. However, DMS-I does have an indirect effect on decisional status via the direct effect DMS-I has on DMT-M. Thus, the cognitive style of a college student influences his or her decisional status in regard to a college major only insofar as the cognitive style influences the person's DMT-M process. The path coefficient of -.18 indicates that a decrease in the intuitive decision-making style produces a small increase in the decision-making process.

Figure 3B depicts the first path model for model set II. The major difference between model sets I and II is that in II, gender does have an indirect effect on decisional status. From Table 1, it can be seen that gender has this indirect effect via its effect on the cognitive style of the individual only when DMS-R is the measure of cognitive style.

The results of the path analysis in the combined non-SIU sample can be summarized by comparing Figure 3A and B to Figure 1 representing the path analysis in the original SIU sample. The stronger paths represented by double arrows in Figure 1 have both been validated in the non-SIU sample. Moreover, the dotted arrows indicating the weakest paths were not significant in cross-validation, thus attesting to their non-generalizability. Only one of the single arrow paths from cognitive styles to the decision-making process is replicated. Figure 3B indicates that perhaps a dotted-line path should be

drawn in Figure 1 from gender to cognitive styles.

Path Analysis on the SIU Retest Sample

Of the original 578 SIU sample, 59% were retested (N=340; Fresh=116, Soph=86, Jun=87, Sen=51; Females=173). The path analysis was performed on this sample to determine what effects maturation of the college student would have on the relationships among the path variables. The results are summarized in Table 2 and Figure 4A and B.

Insert Table 2 and Figure 4 about here

Model set I in Table 2 provides the most general path model for the retested SIU sample. Figure 4A provides a path diagram for model set I incorporating the first path model in that model set. It can be seen that Figure 4A is exactly like Figure 3A. Whether DMS-R or DMS-I is used, the results are the same; just the sign of the path coefficient is changed. We would interpret this finding to indicate that there are no differences among the path variables due to maturation. The differences between Figure 1 and Figure 4A representing a longitudinal comparison can be attributed to lack of replication of the weaker paths rather than maturational effects. Figure 4B, representing model set II, Table 2, provides the most parsimonious model and in fact replicates only the strongest paths indicated in the original study.

Cross-Lagged Panel Analysis

The panel analysis was applied to the large SIU test-retest sample (N=340) and to the smaller SIU freshman test-retest sample (N=98). Only the results of the freshman sample are reported since they have shown more change.

Two statistical control computations were performed on the panel correlations before interpreting the results. The effect of gender was statistically eliminated by computing partial correlations. Secondly, the cross-lagged differences were corrected for changes in

measurement reliability over time. Interpretation of a panel analysis assumes that the synchronous correlations remain stable over time. Synchronous correlations which are not equal may still be stable when they are adjusted for changes due only to changes in reliability. Kenny (1975) has developed a method for computing an estimate of the reliability ratio for each variable and uses this estimate to adjust the synchronous and cross-lagged correlations accordingly to meet what Kenny has termed the quasi-stationarity assumption. Sheridan and Slocum (1977) have shown how these adjustments lead to different interpretations after reanalyzing some earlier studies.

The results of a Z test ($Z=1.96$, $p=.05$) of the differences between the cross-lagged correlations for all possible pairs (55) of variables in this study indicated that five cross-lagged differences were statistically different from zero. The panel diagrams for these five pairs of variables are presented in Figure 5 (A through E).

Insert Figure 5 about here

Figure 5A presents the panel diagram of the relationship between the decision-making process and sex-role attitudes as measured by Bem's masculinity scale. The test-retest autocorrelations for each scale are high, .67 and .68. The time 1 and time 2 synchronous correlations are .18 and .14. When these synchronous correlations are corrected for changes in the reliability in both DMT-M and BSRI-M, the correlation between the two scales at each time period remains about the same, .21 and .12 respectively. Since the difference between the cross-lagged correlations is positive (.27 - .03 = .24) and the synchronous correlations are also positive, there is strong support indicating that progress in the decision-making process causes an increase in the self-attributed sex role of masculinity. Since gender has been partialed out, this causal effect

holds independently of the sex of the student.

The relationship between the decision-making process and the androgeny scale is depicted in Figure 5B. Again, the cross-lagged difference is positive (19 - (-14) = .33); however, one of the synchronous correlations is negative making interpretation more difficult. If both synchronous correlations were negative, the interpretation would be that androgeny causes a decrease in the decision-making process. On the other hand, if both synchronous correlations were positive, we would say that the decision-making process causes an increase in androgeny. Since it was previously found that BSRI-M causes an increase in DMT-M, a check of the partial correlations between BSRI-M and BSRI-X at time 1 and time 2 revealed a high correlation between the two scales, .72 and .80 respectively. This evidence, coupled with the positive cross-lagged difference, supports the hypothesis that the decision-making process causes an increase in the self-attributed sex role of androgeny as well as masculinity.

Figure 5C reveals that the cognitive styles construct as measured by the intuitive decision-making style causes an increase in the self-attributed sex-role of femininity. Figures 5A, 5B, and 5C each suggest that the original path model in Figure 1 may have to be reconceptualized in that the path model assumed that sex-role attitudes influenced both the decision-making process and the cognitive styles of college students. The results of the cross-lagged panel analysis, however, have shown just the opposite to be true.

Figures 5D and 5E provide insight into the relationships among various measures of the sex-role attitude measures. Figure 5D indicates that a college student's perception of more liberal sex-role appropriate behavior for women causes an increase in his or her self-attribution of femininity. Thus, self-ascription follows other-ascription and not vice versa. Figure 5E reveals that an increase in liberal attitudes toward sex-role appropriate behavior for

women causes an increase in more liberal attitudes toward sex-role appropriate behavior for men.

Insert Figure 6 about here

Based on the results of the cross-lagged panel analysis, we can construct a diagram of hypothesized causal relationships to be tested in future research. This diagram is depicted in figure 6. The letters A through E correspond to the five panel diagrams in figure 5. The sex-role self-concept is caused by the decision-making process, the intuitive decision-making style, and the ascription of sex-role appropriate behavior to women. Attributing sex-role behavior to men is caused by the attribution of sex-role behavior to women. These causal relationships are independent of gender. The implications of these relationships will be discussed in the next section.

Discussion

Harren et al. (1978) investigated the effects of gender, sex-role attitudes, cognitive styles and the decision-making process on the decisional status of college students in regard to their having chosen a college major. Using a path analysis technique, Harren et al. concluded that gender influences sex-role attitudes, sex-role attitudes and decision-making style influence progress through the decision-making process, and progress through the decision-making process influences decisional status. The present investigation concerned three questions regarding these findings.

Question 1 inquired whether these same results could be cross-validated to students at other universities. Application of a path analysis to a combined sample of students tested at four different universities has shown that the main paths of influence were validated. However, the Harren et al. conclusion might be modified to show that while gender does influence sex-role attitudes,

sex-role attitudes do not seem to be as critical as decision-making styles in influencing progress through the decision-making process.

Question 2 concerned whether the Harren et al. original results would change as a function of maturation of the student sample. Consequently, the path analysis procedure was computed for those students in the Harren et al. original sample who were retested six months to a year later. The results from this sample were quite similar to the results found in the cross-validation sample. Thus, we concluded that there does not appear to be any major differences in the relationships among the variables insofar as maturation is concerned. Any differences between the results of the original sample and the results in the retested sample are probably due to the same errors of measurement in both samples.

Question 3 concerned the examination of some of the assumptions underlying the use of a path analysis in the original study. To investigate this question, a cross-lagged panel analysis was computed on the SIU test-retest sample of freshmen for all possible pairs of variables in the path analysis. It should first be noted that in the larger SIU sample (comprised of Sophomores, Juniors, and Seniors), the results of the cross-lagged panel analysis was less pronounced. Thus, changes that occur among college students seem to be the most marked within the first semester of college attendance.

The results of the cross-lagged panel analysis were entirely unexpected and do not conform to the path analysis results of the Harren et al. study nor to the initial theorizing underlying that study, as can be seen by contrasting Figure 6 with Figure 1. While the strongest relationships in the path analysis were validated on a different sample, the direction of causality between sex-role attitudes, decision-making styles, and progress in the decision-making process is the opposite of what was expected.

These results call into question the assumption that sex-role attitudes influence career decision making. Rather, decision-making style and progress in the decision-making process influence sex-role attitudes. As students become less intuitive and more rational in decision-making style and as students progress through the decision-making process toward a satisfying choice of major, they become more masculine and androgenous in their sex-role self-concept. (For an interpretation of masculinity as instrumental behavior, see Moreland et al., 1978).

These findings are independent of the content of the student's choice of major. Style and progress in the CDM process toward any satisfying choice of major affect sex-role attitudes. Future research should address the question of whether choice of traditional (same-sex dominant) or non-traditional (opposite-sex dominant) careers influences sex-role attitudes or vice-versa. In any event, these results suggest that commitment to a major and an occupation help crystallize one's identity (Erikson, 1950) and that in so doing, one's sex-role self-concept becomes more masculine and/or androgenous.

The implications of these results for counseling and for developmental programs for college students are considerable. Rather than a direct attempt to change college students' sex-role attitudes, perhaps counseling directed toward a career commitment is more appropriate. As students commit themselves to a career, the core of an identity is formed and their sex-role attitudes are modified in keeping with this identity. The point to be made here is that one's commitment to a career is central to one's identity and one's sex-role self-concept.

Both the theoretical and applied literature in counseling psychology reflect the assumption that sex-role standards influence career choice. The results of this study, in their extreme, suggest that progress at career-related

decisional tasks causes individuals to change their self-attribution of sex-role related qualities. The further the progress in the decisional task, the more androgenous the individual's self-concept. Helping college students successfully complete developmental decisional tasks may afford them enough time or security to develop cross-sex qualities which were overlooked during previous socialization. Subsequent decisions can then be based upon a more full self-assessment. It seems important for counseling psychologists to recognize that self-assessment influences decisions and decision making influences self-assessment.

The panel analyses also suggest another interesting implication. Much of sex-role literature suggests that if you help a person change their self-concept, you will find consequent attitudinal changes. Our analyses showing the ascription of role behavior to women causes self-attributes of femininity suggest that programs or activities designed to directly influence sex-role attitudes will yield a greater change in self-attributed qualities than will the reverse.

References

Bem, S. L. The measurement of psychological androgeny. Journal of Consulting and Clinical Psychology, 1974, 42, 155-162.

Berman, M. R., Gelso, C. J., Greenfeig, B. R., & Hirsch, R. The efficacy of supportive learning environments for returning women: An empirical evaluation. Journal of Counseling Psychology, 1977, 24, 324-331.

Bodden, J. L. Cognitive complexity as a factor in appropriate vocational choice. Journal of Counseling Psychology, 1970, 17, 364-368.

Cochran, D. J., Hoffman, S. C., Strand, K. H., & Warren, P. M. Effects of client/computer interaction on career decision-making process. Journal of Counseling Psychology, 1977, 24, 308-312.

Erickson, E. H. Childhood and society. New York: Norton, 1950.

Harren, V. A. Assessment of career decision making. Progress Report, May, 1976. Available from Vincent A. Harren, Department of Psychology, Southern Illinois University, Carbondale, Illinois, 62901.

Harren, V. A., Kass, R. A., Tinsley, H. E. A., & Moreland, J. R. Influence of sex role attitudes and cognitive styles on career decision making. Journal of Counseling Psychology, 1978, 25, 390-398.

Holland, J. L., & Holland, J. E. Vocational indecision: More evidence and speculation. Journal of Counseling Psychology, 1977, 24, 404-414.

Hunt, D. E. Matching models in education. Ontario Institute for Studies in Education, 1971.

Kenny, D. A. Cross-lagged panel correlations: A test for spuriousness. Psychological Bulletin, 1975, 82, 887-905.

Kerlinger, F. N., & Pedhazur, E. J. Multiple regression in behavioral research. New York: Holt, Rinehart and Winston, Inc., 1973.

Miller, A. L., & Tiedeman, D. V. Decision making for the 70's: The cubing of the Tiedeman paradigm and its application in career education. Focus on Guidance, 1972, 5, 1-15.

Moreland, J. R., Gulanick, N., Montague, E. K., & Harren, V. A. Some psychometric properties of the Bem Sex-Role Inventory. Applied Psychological Measurement, 1978, 2, 249-256.

Moreland, J. R., & Van Tuinan, M. The Attitudes Toward Masculinity-Transcendence Scale, Southern Illinois University, Department of Psychology, 1976.

Sheridan, J. E., & Slocum, J. W., Jr. Causal differences in motivation research: A reinterpretation of results of panel studies. Journal of Applied Psychology, 1977, 62, 510-513.

Smith, R. D., & Evans, J. R. Comparison of experimental group guidance and individual counseling as facilitators of vocational development. Journal of Counseling Psychology, 1973, 20, 202-208.

Spence, J. T., & Helmreich, R. The Attitudes Towards Women Scale: An objective instrument to measure attitudes toward the rights and roles of women in contemporary society. Journal Supplement Abstract Service Catalog of Selected Documents in Psychology, 1972, 2, 66-67. (M.S. No. 617).

Spence, J. T., Helmreich, R., & Stapp, F. A short version of the Attitudes Towards Women Scale (AWS). Bulletin of the Psychonomic Society, 1973, 2, 219-220.

Streufert, D. E. Differential classroom effects upon the vocational decision-making processes of male college students grouped according to conceptual level (Doctoral Dissertation, University of Iowa, 1975).

Tiedeman, D. V., & O'Hara, R. P. Career development: Choice and adjustment. New York: College Entrance Examination Board, 1963.

Wachowiak, D. Model-reinforcement counseling with college males. Journal of Counseling Psychology, 1972, 19, 387-392.

Table 1

Path Coefficients for the Combined Non-SIU Sample

Model Sets	(B) ↑ (A)	Specific Paths from A to B: Sex Role	Cognitive Style		DMT-M		Decisional Status			Scales in Path Analysis	
		Gender	Gender	Sex Role	Sex Role	Cognitive Style	Sex Role	DMT-M	Cognitive Style	Sex Role	Cognitive Style
		43				-18		52		BSRI-F	DMS-I
		16				-18		52		BSRI-X	DMS-I
I		32				-18		52		AWS	DMS-I
		43				-14		52		BSRI-F	DMS-D
		16				-14		52		BSRI-X	DMS-D
		32				-14		52		AWS	DMS-D
		43	17			19		52		BSRI-F	DMS-R
II		16	17			19		52		BSRI-X	DMS-R
		32	17			19		52		AWS	DMS-R
III		31				-18	14	52		AMTS	DMS-I
		31				-14	14	52		AMTS	DMS-D
IV		31	17			19	14	52		AMTS	DMS-P
V			17			19		52		BSRI-M	DMS-P
VI						-18		52		BSRI-M	DMS-I
VII								52		BSRI-M	DMS-D

Note: Decimal points have been omitted.

Table 2

Path Coefficients for the SIU Retest Sample

	Specific Paths from A to B										
	(B)	Sex Role	Cognitive Style		DMT-M		Decisional Status			Scales in Path Analysis	
Model Sets	(A)	Gender	Gender	Sex Role	Sex Role	Cognitive Style	Sex Role	DMT-M	Cognitive Style	Sex Role	Cognitive Style
		37				16		54		BSRI-F	DMS-R
		37				16		54		AMTS	DMS-R
		38				16		54		AWS	DMS-R
I		-30				-23		54		BSRI-M	DMS-I
		37				-23		54		BSRI-F	DMS-I
		37				-23		54		AMTS	DMS-I
		38				-23		54		AWS	DMS-I
		-30						54		BSRI-M	DMS-D
II		37						54		BSRI-F	DMS-D
		38						54		AWS	DMS-O
III						-23		54		BSRI-X	DMS-I
IV		37			-19			54		AMTS	DMS-D
V		-30		14		16		54		BSRI-M	DMS-R
VI					15[1]	16		54		BSRI-X	DMS-R
VII					15[1]			54		BSRI-X	DMS-D

Note: Decimal points have been omitted.

Figure Captions

Figure 1. Path diagram model depicting the degree to which the empirical results support the hypothesized causal relationships between gender, sex-role attitudes, cognitive styles, decision-making process and decisional status regarding a college major (Harren et al., 1977).

Figure 2. An example of cross-lagged panel analysis to test the null hypothesis of a spurious relationship between decision-making process and decisional status regarding a college major.

Figure 3. Path diagram model depicting the first two model sets for the non-SIU sample. Path diagram 3A and 3B correspond to model sets I and II in Table 1.

Figure 4. Path diagram model depicting the first two model sets for the SIU retest sample. Path diagram 4A and 4B correspond to model sets I and II in Table 2.

Figure 5. Panel relationships between variables for which a significant difference between cross-lagged correlations was found. Correlations in parentheses are adjusted by the reliability ratio estimate.

Figure 6. Diagram depicting the causal relationship among the variables as a result of the cross-lagged panel analysis. The letters A through E correspond to the panel diagrams in Figure 5.

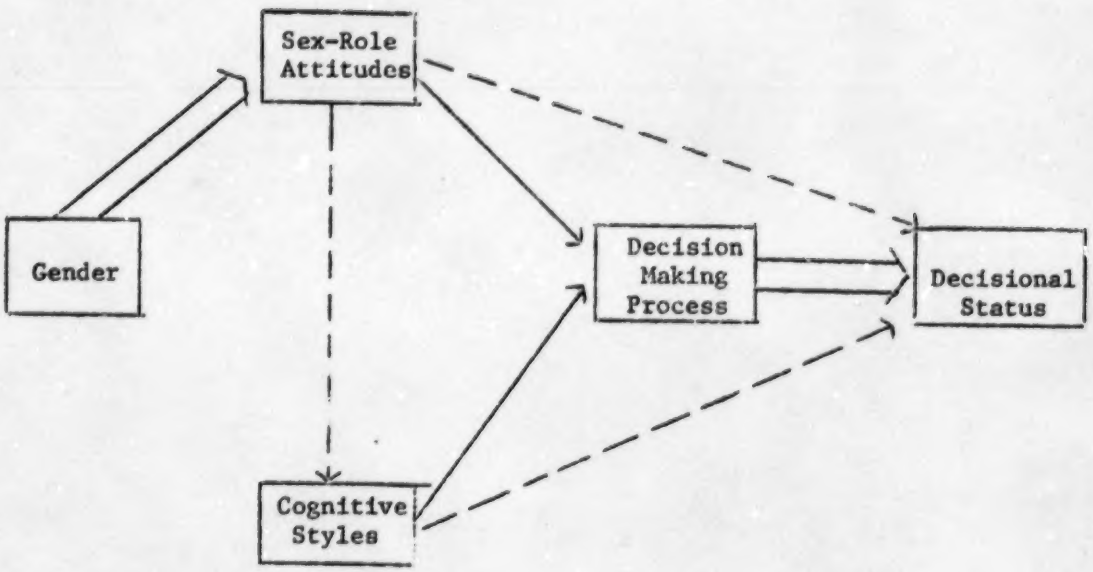

Sex-Role Attitudes
Gender
Decision Making Process
Decisional Status
Cognitive Styles

Figure 1.

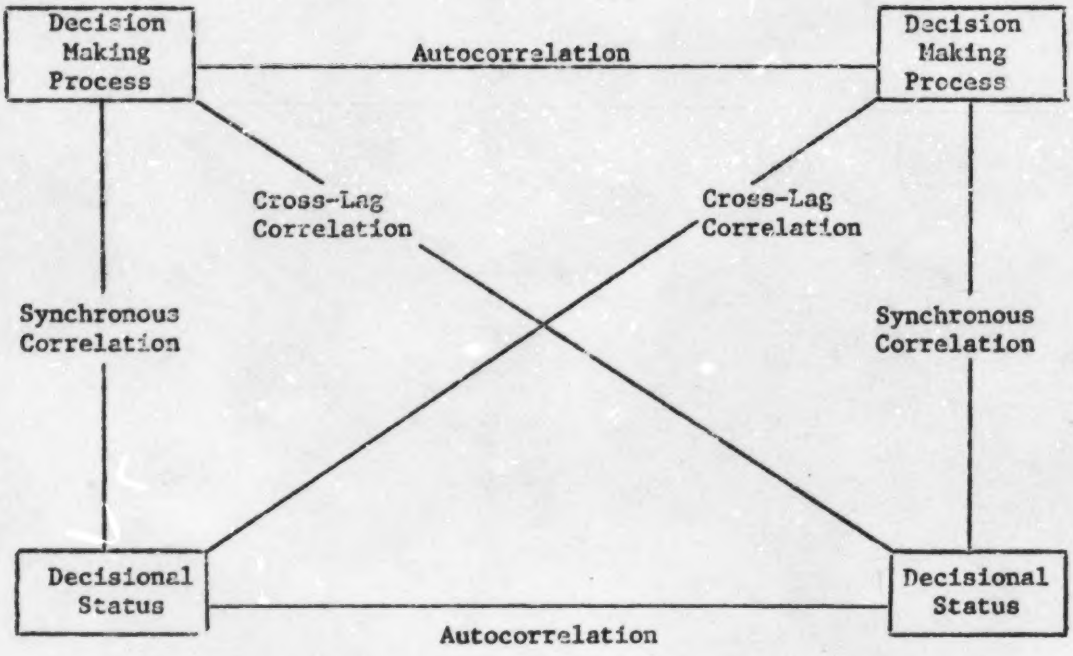
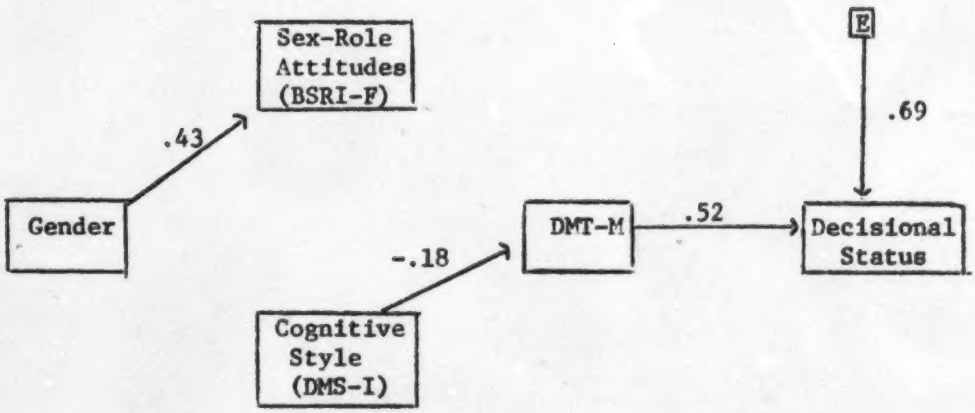

Decision Making Process
Autocorrelation
Decision Making Process
Cross-Lag Correlation
Cross-Lag Correlation
Synchronous Correlation
Synchronous Correlation
Decisional Status
Decisional Status
Autocorrelation
Time 1
Time 2

Figure 2.

A


Sex-Role
Attitudes
(BSRI-F)
.43
Gender
E
.69
DMT-M
.52
Decisional
Status
-.18
Cognitive
Style
(DMS-I)

B

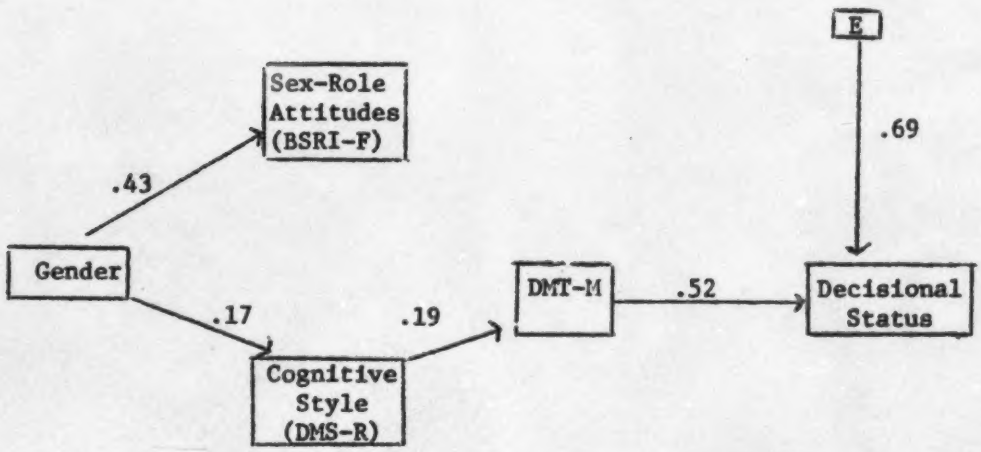
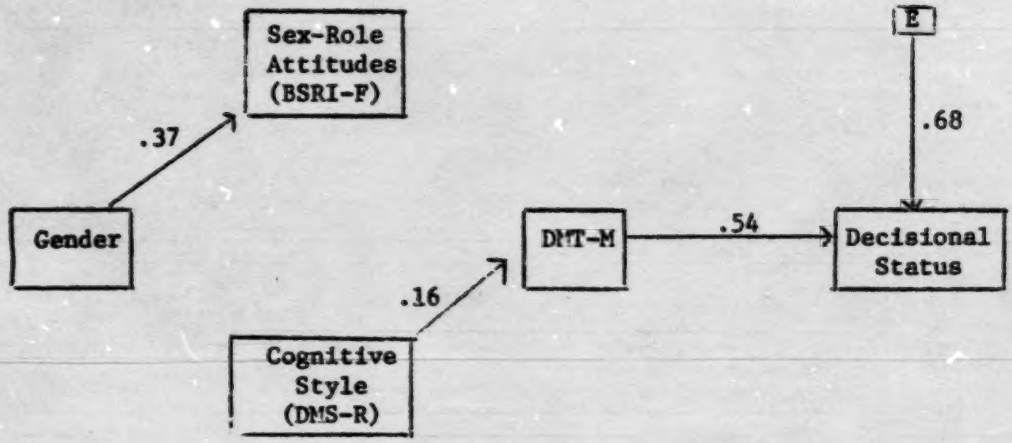

Sex-Role
Attitudes
(BSRI-F)
.43
Gender
E
.69
DMT-M
.52
Decisional
Status
.17
.19
Cognitive
Style
(DMS-R)

Figure 3.

A


Sex-Role Attitudes (BSRI-F)
.37
Gender
.16
Cognitive Style (DMS-R)
DMT-M
.54
Decisional Status
E
.68

B

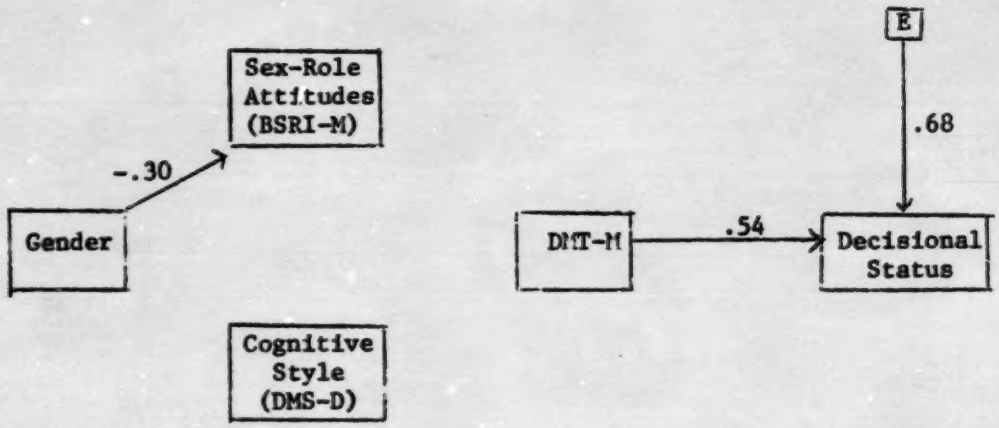
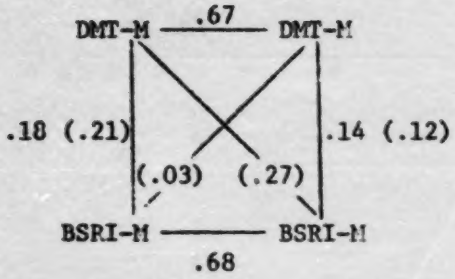

Sex-Role Attitudes (BSRI-M)
-.30
Gender
Cognitive Style (DMS-D)
DMT-M
.54
Decisional Status
E
.68

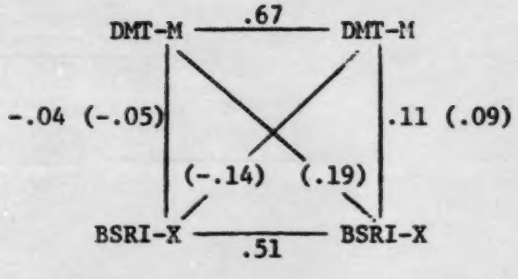
Figure 4

A



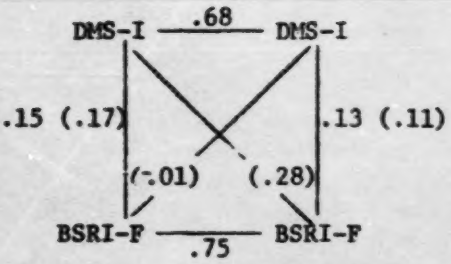
Cross-lagged Difference = .24

B



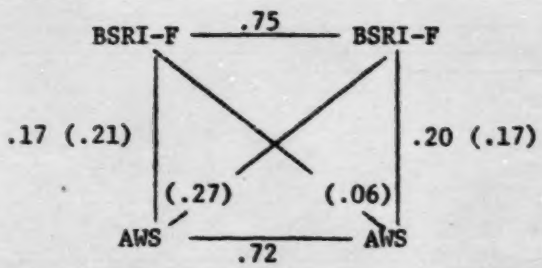
Cross-lagged Difference = .33

C



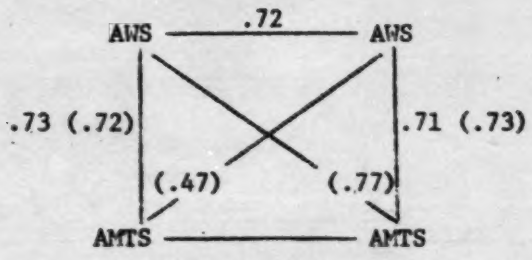
Cross-lagged Difference = .29

D



Cross-lagged Difference = -.21

E



Cross-lagged Difference = .30

Figure 5.

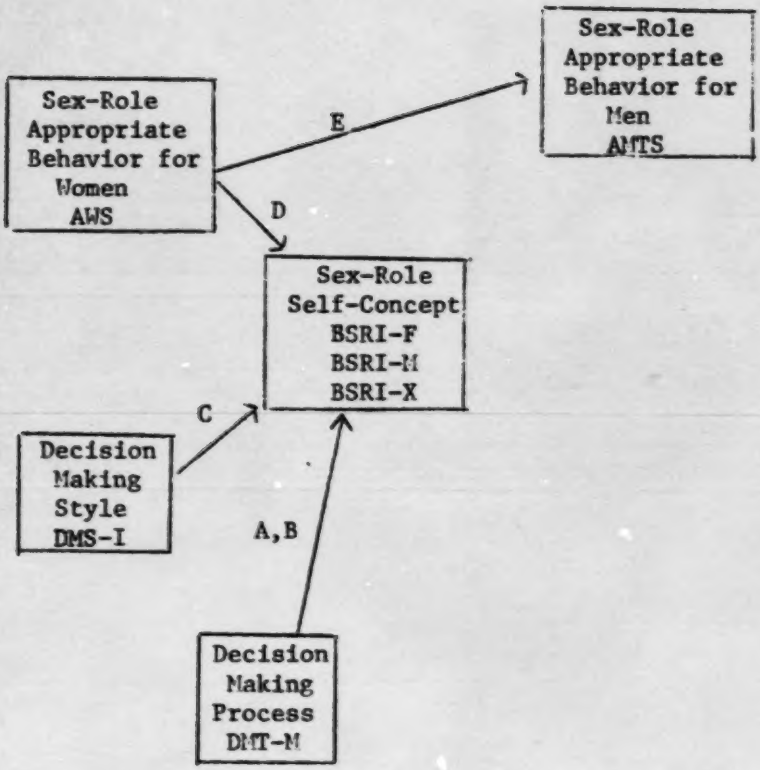

Sex-Role Appropriate Behavior for Men AMTS
Sex-Role Appropriate Behavior for Women AWS
E
D
Sex-Role Self-Concept BSRI-F BSRI-M BSRI-X
C
Decision Making Style DMS-I
A,B
Decision Making Process DMT-M

Figure 6.